

(2) For engines used in helicopters the applicant must conduct the runs specified in paragraph (d) of this section, except—

(i) The entire run specified in paragraph (d)(1) of this section must be made at critical altitude pressure;

(ii) The portions of the runs specified in paragraphs (d)(2) and (3) of this section at rated maximum continuous power must be made at critical altitude pressure and the portions of the runs at other power must be made at 8,000 feet altitude pressure;

(iii) The entire run specified in paragraph (d)(4) of this section must be made at 8,000 feet altitude pressure;

(iv) The portion of the runs specified in paragraph (d)(5) of this section at 80 percent of rated maximum continuous power must be made at 8,000 feet altitude pressure and the portions of the runs at other power must be made at critical altitude pressure;

(v) The entire run specified in paragraph (d)(6) of this section must be made at critical altitude pressure; and

(vi) The turbosupercharger used during the endurance test must be run on the bench for 50 hours at the limiting turbine wheel inlet gas temperature and rotational speed for rated maximum continuous power operation unless the limiting temperature and speed are maintained during 50 hours of the rated maximum continuous power operation.

[Amdt. 33-3, 32 FR 3736, Mar. 4, 1967, as amended by Amdt. 33-6, 39 FR 35465, Oct. 1, 1974; Amdt. 33-10, 49 FR 6851, Feb. 23, 1984]

§ 33.51 Operation test.

The operation test must include the testing found necessary by the Administrator to demonstrate backfire characteristics, starting, idling, acceleration, overspeeding, functioning of propeller and ignition, and any other operational characteristic of the engine. If the engine incorporates a multispeed supercharger drive, the design and construction must allow the supercharger to be shifted from operation at the lower speed ratio to the higher and the power appropriate to the manifold pressure and speed settings for rated maximum continuous power at the

higher supercharger speed ratio must be obtainable within five seconds.

[Doc. No. 3025, 29 FR 7453, June 10, 1964, as amended by Amdt. 33-3, 32 FR 3737, Mar. 4, 1967]

§ 33.53 Engine component tests.

(a) For each engine that cannot be adequately substantiated by endurance testing in accordance with § 33.49, the applicant must conduct additional tests to establish that components are able to function reliably in all normally anticipated flight and atmospheric conditions.

(b) Temperature limits must be established for each component that requires temperature controlling provisions in the aircraft installation to assure satisfactory functioning, reliability, and durability.

§ 33.55 Teardown inspection.

After completing the endurance test—

(a) Each engine must be completely disassembled;

(b) Each component having an adjustment setting and a functioning characteristic that can be established independent of installation on the engine must retain each setting and functioning characteristic within the limits that were established and recorded at the beginning of the test; and

(c) Each engine component must conform to the type design and be eligible for incorporation into an engine for continued operation, in accordance with information submitted in compliance with § 33.4.

[Amdt. 33-6, 39 FR 35466, Oct. 1, 1974, as amended by Amdt. 33-9, 45 FR 60181, Sept. 11, 1980]

§ 33.57 General conduct of block tests.

(a) The applicant may, in conducting the block tests, use separate engines of identical design and construction in the vibration, calibration, detonation, endurance, and operation tests, except that, if a separate engine is used for the endurance test it must be subjected to a calibration check before starting the endurance test.

(b) The applicant may service and make minor repairs to the engine during the block tests in accordance with